

SECTION 01 45 24

TESTING PROGRAM REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Data to be recorded.
- B. Training.
- C. Tests.

1.02 RELATED SECTIONS

- A. General requirements for training of BART personnel in the operation and maintenance of the various project electrical systems are specified in Section 01 79 00 - Demonstration and Training.

1.03 COORDINATION

- A. Submit written notice as to when the installed systems will be tested so that the Engineer can be present to witness the tests. Give a minimum of 15 calendar days notice before performing the proposed tests.
- B. Where specialized or heavy electrical equipment is involved, a representative of the manufacturer will be required to be present to witness the tests and verify the results.

1.04 SUBMITTALS

- A. General: Refer to Section 01 33 00 - Submittal Procedures, and Section 01 33 23 - Shop Drawings, Product Data, and Samples, for submittal requirements and procedures.
- B. Testing Program: Submit overall test schedule and test procedures for review before beginning the testing of the systems. Each procedure shall include the following:
 - 1. Statement of procedure objective and scope;
 - 2. List of equipment required to set up and perform the procedure;
 - 3. List of equipment or services required from areas outside the Contractor's authority;
 - 4. List of prerequisite tests that need to be completed before the procedure can be performed;
 - 5. Description of the required procedure setup, including diagrams illustrating test equipment connections and identifying test points, where applicable;
 - 6. Step-by-step instructions for performing the procedure identifying the points where data is to be recorded and the limits for acceptable data;
 - 7. Provisions for recording pertinent test conditions and environment at time of test; and
 - 8. Instructions for recording data on data sheets and verifying that procedure steps have been completed.
- C. Test Reports: Submit certified test reports of the results of tests performed on installed systems.

- D. Instruments: Submit list of instruments and certification indicating that the instruments that will be used for testing have been calibrated and their accuracy certified within a previous period of not more than six months. List types of instruments to be used, manufacturer, serial number, latest date of calibration, and calibration organization.

1.05 GUARANTY

- A. Tests shall not alter the Contractor's guaranty of the equipment. Replace and retest work and materials found to be in noncompliance with these Specifications at no additional cost to the District.

1.06 DATA TO BE RECORDED

- A. Maintain reproducible test data sheets showing results of tests specified in the accepted test procedures. Provide reproducible data sheets, listing acceptable or specified test limits and values actually measured. Furnish one copy to the Engineer. Retain one copy.
- B. Provide data sheets showing test set-up, equipment used, names of persons performing test, names of witnesses, date, location, and serial number of equipment under test. Test data sheets shall be reviewed by the Engineer, and the Engineer may accept the test data sheets as submitted, or additional tests may be required. If additional tests are required because initial test results do not comply with these Specifications, the re-testing shall be documented and submitted as before at no additional cost to the District.

1.07 TRAINING

- A. Provide training for BART operating and maintenance personnel as specified in Section 01 79 00 - Demonstration and Training, and as follows:

<u>Equipment/System</u>	<u>Training Time (hrs)</u>
*Standby Generator	4
*Fire Alarm	8
Access Control	2
Support Annunciator Panel	2
Lighting Control Panels	2
Train Control Room-Temp Control Panel	2

* Training shall be on-site and shall include training by the respective manufacturer's representative where marked with an asterisk.

PART 2 - PRODUCTS

2.01 MATERIALS, EQUIPMENT, AND SERVICES

- A. Provide test procedures, qualified technical personnel, tools, equipment, test instruments, facilities, and services as required to perform the testing. The Engineer will have qualified witnesses present at each test to observe the test and to certify recorded results.

- B. For the extended coverage, provide qualified technical support personnel, tools, test instruments, and services on demand when given at least 24 hours notice.
- C. The Contractor shall be present at all tests performed by others.
 - 1. Verify that the interface parameters sought are in compliance with the test data sheets accepted by the Engineer; or
 - 2. Perform work as necessary to ensure that the accepted interface parameters are met.

PART 3 - EXECUTION

3.01 TESTS

- A. Grounding System Verification: Verify and test that the grounding system is installed as indicated, and that resistance to earth does not exceed five ohms.
- B. Auxiliary Electrical Distribution System Conductor Insulation Test: Measure insulation resistance of major feeders in auxiliary electrical distribution system and compare measured values against ten megohms value.
- C. Auxiliary Electrical Distribution System Equipment Readiness: Verify by testing that auxiliary power equipment can be energized.
- D. Auxiliary Electrical Distribution System Operability Test and Switchboard Breakers: Perform testing of operation in accordance with Specification requirements.
- E. Auxiliary Electrical Distribution System Verification of Service to Train Control Room and Traction Power Substation: Verify by testing that the required auxiliary electrical service is available in the Train Control Room and Traction Power Substation.
- F. Auxiliary Electrical Distribution System Verification of Service to Escalators, Elevators, and Fare Collection Distribution Panel: Verify that auxiliary electric service is available to escalators, elevators, and fare collection distribution panels.
- G. Lighting and Receptacle System Operability: Verify by testing the operability of all lighting and receptacle circuits.
- H. Auxiliary Electrical Emergency Power System: Verify by testing the operability of the standby electrical emergency power system (uninterruptible power system) in accordance with Specification requirements.
- I. Verification of Service to and Control of Illuminated Signs: Verify by testing that power and control circuits are available for illuminating signs.
- J. Verification and Testing for Electrical Door Strikes and Door Position Indicators: Verify by testing the integrity and operation of electric door strikes and door position indicators.
- K. Auxiliary Electrical Supervisory and Control System: Simulate testing remote control and indication to ensure operability of auxiliary equipment and systems for interface.

END OF SECTION 01 45 24